Claims

1. A method of magnetic resonance imaging of a sample, said method comprising:

i) administering a hyperpolarised MR imaging agent comprising non-zero nuclear spin nuclei into said sample;

ii) exposing said sample to a radiation at a frequency selected to excite nuclear spin transitions in said non-zero nuclear spin nuclei;

iii) detecting MR signals from said sample and utilising spectral-spatial excitation, in combination with line scanning, point scanning and/or steady state imaging techniques; and

iv) optionally generating an image, physiological data or metabolic data from said detected signals.

2. The method as claimed in claim 1 wherein step iii) is carried out after the agent has left the vascular bed.

3. The method as claimed in claim 1 or 2 wherein for steady state imaging a fully balanced version of gradient sequences is used.

4. The method as claimed in any of the claims 1 to 3 wherein for steady state imaging FISP or PSIF pulse sequences with high flip angles are used.

5. The method as claimed in any of the claims 1 to 4 wherein said non-zero nuclear spin nuclei are selected from the group consisting of ^{1}H, ^{3}He, ^{3}Li, ^{13}C, ^{15}N, ^{19}F, ^{29}Si, ^{31}P and ^{129}Xe.

6. The method as claimed in any of the claims 1 to 5 wherein said non-zero nuclear spin nuclei are selected from the group consisting of ^{13}C and ^{15}N, especially ^{13}C nuclei.

7. The method as claimed in any one of the claims 1 to 6 wherein said MR imaging agent is artificially enriched with nuclei having a T_1 relaxation time of more than 5s.

8. The method as claimed in claim 6 wherein the MR imaging agent has an effective nuclei ^{13}C polarisation of more than 1%.

9. The method as claimed in claim 6 wherein the MR imaging agent is ^{13}C enriched at carbonyl or quaternary carbon positions.

10. The method as claimed in claim 9 wherein said ^{13}C enriched compound is deuterium labelled adjacent said ^{13}C nucleus.

11. The method as claimed in any one of claims 6 to 10 wherein said ^{13}C nuclei are surrounded by one or more non-MR active nuclei or entities selected from the group consisting of O, S, C or a double or triple bond.

12. The method as claimed in any of the claims 1 to 11 wherein step iii) utilises spectral-spatial excitation combined with a steady state imaging technique.

13. The method as claimed in any of the claims 1 12 wherein said imaging agent comprises a compound selected from the following: